

APPLICANT:
U.S.S.N.:

David G. Williams
09/586,824

REMARKS

Amendments to the Claims

Upon entry of the present amendments, claims 8, 11, 14 and 19-33 are pending. Claims 1-7, 9, 10, 12, 13 and 15-18 are cancelled without any intention to abandon any subject matter of these claims, but with the intention that claims of the same, lesser, or greater scope may be pursued in a later application. Original claims 8 and 24 are amended. Claim 8 was amended to better capture commercial embodiments of interest, in particular those not limited to the use of a unitary inflatable tubular member. New claims 25-33 are added. Support for new claims 25-33 is found, *e.g.*, in the original claims, in the second and third paragraphs on page 7, and in FIG. 7 of the present application, as filed. The present amendment does not introduce new matter.

35 U.S.C. §112

Claim 9 was rejected under 35 U.S.C. §112, first paragraph, as containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Claim 9 has been cancelled, thereby mooted this ground for rejection.

Nevertheless, to the extent that the subject matter of claim 9 may be claimed elsewhere or at a later date, Applicant respectfully submits that support for original claim 9 is found, *e.g.*, at page 3, third paragraph, and in the first sentence of the paragraph bridging pages 8 and 9 of the present application, as filed.

Objections to Claims

Claim 3 was objected to as being in improper format. Claim 3 has been canceled, thereby remedying this objection.

Claim 8 was objected to on the basis of an oversight in which the term, “or,” was used in place of the term, “of.” Applicant thanks the Examiner for drawing attention to this oversight, and Applicant has consequently amended Claim 8 to remove the term, “or,” thereby removing the basis for this objection.

Obviousness-Type Double Patenting

Claims 8-23 have been rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over U.S. Patent 6,067,903, issued to Williams, in view of U.S. Patent 3,416,445, issued to Krueger, Jr. The Patent Office noted, however, that this rejection can be overcome by the timely filing of a terminal disclaimer in compliance with 37 CFR §1.321(c) provided the conflicting patent is shown to be commonly owned with this application.

U.S. Patent 6,067,903, which is in the chain of priority for the present application, is, in fact, commonly owned with the present application. Accordingly, a terminal disclaimer is filed herewith to overcome this rejection.

35 U.S.C. §102

Claims 1-3 and 5 were rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent 3,416,445, issued to Krueger, Jr. (hereafter, "Krueger"). Claims 1-3 and 5 have been canceled, thereby mooting this ground for rejection.

35 U.S.C. §103(a)

Claims 4, 6, 7 and 24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Krueger, in view of U.S. Patent 5,979,312, issued to Williams (hereafter, "Williams"). Of these claims, only claim 24, which is amended herein, remains pending.

As a preliminary matter, Applicant notes that Williams is believed not to qualify as prior art under 35 U.S.C. §102 because Applicant's claims are entitled to the priority of the July 20, 1995, filing date of GB 9514927.4. A copy of the Declaration from U.S.S.N. 08/983,621 (now U.S. Patent 6,067,903), which claims priority to GB 9514927.4, is being filed concurrently with this Amendment as a Supplemental Declaration in the present application. The present application is a divisional of U.S.S.N. 09/483,253, which is a continuation of U.S.S.N. 08/983,621. A copy of this Declaration was likewise filed in U.S.S.N. 09/483,253.

Nevertheless, because many of the teachings of Williams are also found in GB 2 264 460, which was published 1 September 1993, and is related to the Williams patent cited in the Office Action, the teachings of Williams are discussed and compared with Applicant's claims, below.

The Patent Office noted that although the receiving apertures of Krueger are circular holes, Williams teaches the conventionality of providing the stencil with receiving apertures in the shape of elongated slots separated by a plurality of elongated strips. Further, the Patent Office stated that it would have been obvious to those having ordinary skill in the art to provide the stencil of Krueger with a plurality of elongated slots appropriately disposed as taught by Williams in order to achieve more-even tensioning along the peripheral edges of the stencil. A comparison of claim 24 and Applicant's new claims with the teachings of Krueger and Williams is provided, below.

Claims 24-27

Claim 24, as amended, and new claims 25-27, which depend from claim 24, specify, *inter alia*, that the four peripheral edges that define the central body are provided with a plurality of elongated slots separated by a plurality of elongated strips, wherein the elongated slots and elongated strips are of substantially the same width. These claims read upon stencils designed for use with the apparatus described in commonly-owned U.S. Patent 6,067,903.

As explained in the first paragraph on page 3 of the present application, such an apparatus for supporting and tensioning a stencil can be designed with mounting teeth that do not extend into the plane of the central body of the tensioned stencil. Consequently, the edge regions of the stencil are flexed over/under surfaces of the frame and engaged by the mounting teeth. In such an embodiment, as described in the second paragraph on page 7 of the present application, slots and separating strips of substantially-equal width can facilitate flexing and even-tensioning of the stencil.

In the screen stencil described in Krueger, the central body of the stencil is a mesh screen. As further described in Krueger at Col. 2, line 68, through Col. 3, line 17, a strip that is substantially rigid with respect to the plane of the screen is sealed to the elements or strands of the mesh and cut into separate border sections. Holes are then drilled into the border sections for

mounting. The border sections are described as being substantially rigid (inflexible) in the plane of the surface of the mesh screen, *id.*, Col. 3, lines 3-4. Accordingly, it is understood that the rigid border sections of Krueger provide substantially-uniform tension across the stretchable mesh elements to which they are joined. In view of the rigidity provided by the border sections, it is expected that providing just two holes in each border section, as described and illustrated in Krueger, would provide means for mounting the mesh to a tensioning apparatus and providing the requisite level of uniform tension across the mesh.

Williams discloses a stencil having elongate slots for tensioning and imparting flexibility along two edges of the stencil. However, no suggestion or motivation is apparent for incorporating the elongate slots and strips of Williams into the screen stencil of Krueger for the reasons mentioned, particularly because:

- (1) the rigid border sections of Krueger appear to impart the requisite uniformity of tension across the stretchable mesh, and
- (2) there is no motivation for improving the flexibility of the border sections of Krueger about their long axes because the screen stencil of Krueger is not flexed along its edges.

Consequently, Applicant respectfully submits that no suggestion or motivation is apparent for incorporating the elongate slots and strips of Williams into the screen stencil of Krueger. Applicant therefore requests that this ground for rejection against claim 24 be reconsidered and withdrawn.

Claim 28-33

New claim 28 specifies, *inter alia*, that the stencil includes a metal sheet in which a patterned aperture for printing solder is formed and that the metal sheet also has four peripheral edges, each defining a plurality of receiving apertures. New claims 29-33 depend from claim 28 and, therefore, incorporate these limitations as well.

Neither Williams nor Krueger describe or suggest a metal sheet including both the patterned aperture and the receiving apertures along four edges. Krueger describes a screen

stencil with bi-directional elements or strands, which require bi-directional tension to maintain their relative orientation. This motivation for providing bi-directional tension in Krueger is absent from the metal sheet described in claim 28 since the metal sheet of claim 28 is substantially unstretchable in the x- and y-directions (within the plane of the sheet) in comparison to the mesh of Krueger.

Though Williams discloses the use of a patterned metal sheet including apertures along two edges, Williams falls short of suggesting the invention of claims 28-33 on at least two grounds:

- (1) Williams does not disclose or suggest the advantage of bi-directionally tensioning the metal sheet; and
- (2) Williams does not disclose or suggest an apparatus, such as that disclosed in U.S. Patent 6,067,903, that is capable of engaging the slots along the four peripheral edges of the metal sheet and providing tension in each direction.

Consequently, neither reference suggests or motivates fabrication of the stencil described in claim 28 for use with such an apparatus. Accordingly, Applicant submits that the stencils described in claims 28-33 are nonobvious in view of Williams and Krueger.

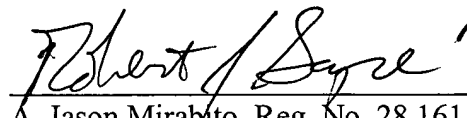
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CONCLUSION

On the basis of the foregoing amendments, Applicants respectfully submit that pending claims 8-33 are in condition for allowance. If there are any questions regarding these amendments and remarks, the Examiner is encouraged to contact either of the undersigned at the telephone number provided below.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1-7, 9, 10, 12, 13 and 15-18 have been canceled.

New claims 25-33 have been added.

Claims 8 and 24 have been amended as follows:

8. (Amended) An apparatus for supporting and tensioning a stencil to enable solder printing of circuit boards and other electronic substrates, comprising:

~~a support frame having four side members with each side member connected to another side member and including a channel which extends continuously through each side member;~~

a displaceable at least two pairs of opposed mounting bar members engaged associated with each or said four side the support frame, members with each at least one member in each pair of mounting bar members being reciprocally displaceable toward the other member of the pair, disposed within the channel and with each mounting member including a mounting plate, which carries a plurality of one or more projections extending from the mounting plate to comprise a terminal side edge, and an inclined surface adjacent the mounting plate, which angles the mounting plate;

a mechanism to bias each with each reciprocally-displaceable mounting bar member being biased via a first bias away from another opposing mounting bar the other member of the pair;

a unitary inflatable tubular member disposed within the channel and extending through the four side members to displace each mounting bar toward another opposing mounting bar a mechanism configured to selectively apply a second bias to each biased member to counteract the first bias and displace the biased member toward the other member of the pair; and

a stencil comprising a central body having one or more apertures formed through the stencil thickness to define a pattern for printing solder on said substrate, said central body of said stencil defined by four peripheral edges, wherein each of said four peripheral edges of said stencil comprises a plurality of receiving apertures, said receiving apertures configured to receive said ~~plurality of projections on~~ of each of said mounting plates members ~~when said stencil is positioned on said support frame~~, such that when said ~~mounting bars are biased away from each other~~ the second bias is not applied, said stencil is tensioned ~~on all sides and kinking or deformation of said stencil on said support frame~~ is eliminated along the axes.

11. (Amended) The apparatus for supporting and tensioning a stencil of claim 9 ~~8~~, further comprising an elongate support surface abutting the stencil when the stencil is mounted on the projections, wherein the elongate support surface is curved to facilitate flexing of the stencil.
14. (Amended) The apparatus for supporting and tensioning a stencil of claim 13 ~~8~~, wherein the plurality of projections do not extend into a horizontal plane of the stencil when the stencil is engaged and flexed thereon.
24. (Amended) ~~A device for printing materials onto surface contacts on a circuit board or other electronic substrate, comprising:~~

a stencil comprising a central body having one or more apertures formed through the stencil thickness to define a pattern for printing solder on said a substrate, said central body of said stencil defined by four peripheral edges, ~~wherein opposing edges are of equal length, and~~ wherein each of said four peripheral edges of said stencil is provided with a plurality of receiving apertures which define a plurality of elongated slots separated by a plurality of elongated strips, said elongated slots and said elongated strips being of substantially the same width.